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IS 11811 (1986): Alkyd resins [CHD 20: Paints, Varnishes and Related Products]

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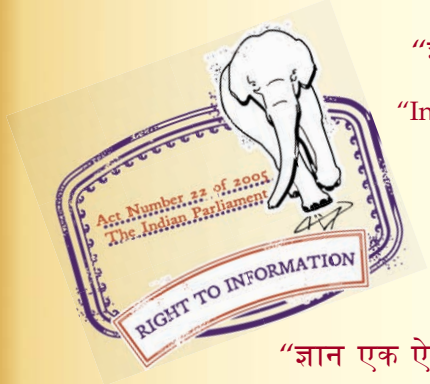

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Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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Indian Standard

SPECIFICATION FOR ALKYD RESINS

UDC 667·621·633 : 678·674

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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May 1987

Indian Standard

SPECIFICATION FOR ALKYD RESINS

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Indian Standard

SPECIFICATION FOR ALKYD RESINS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 July 1986, after the draft finalized by the Raw Materials for Paints Industry Sectional Committee had been approved by the Chemical Division Council.

0.2 Alkyd resins are one of the important raw material used by paint industries. With indigenous production, growth in the usage and consequent demand for alkyds, the need has been felt for the preparation of this standard.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This Indian standard prescribes the requirements and methods of sampling and test for alkyd resins used in paint industry.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 1303-1983† and IS : 6667-1972‡ shall apply.

3. CLASSIFICATION OF ALKYD RESINS

3.1 Alkyd resins are classified as follows.

3.1.1 On the basis of fatty oil/acid content:

Types of Alkyds	*Percentage of Fatty Acid*
Short oil alkyd	Up to 40
Medium oil alkyd	Above 40 and below 60
Long oil alkyd	60 and above

*Rules for rounding off numerical values (*revised*).
†Glossary of terms related to paints (*second revision*).
‡Glossary of terms used in synthetic resin industry.

3.1.1.1 The types of fatty oils/acids used shall be as follows:

Types of Fatty Oils/Acids	*Iodine Value*
Drying oil	170 and above
Semi-drying oil	From 110 and below 170
Non-drying oil	below 110

3.1.2 On the basis of modifying chemicals:

Types of Alkyds	*Chemical Modifier*
Rosinated alkyd	Wood/gum resin
Chain stopped alkyd	Monobasic acids or monohydric alcohols
Vinylated alkyd	Vinyl acrylic or any unsaturated monomers
Phenolated alkyd	Any phenol and any aldehyde
Uralkyd	Disocyanates
Siliconised alkyd	Silicones or silanes
Epoxy alkyd	Epoxy compounds

NOTE 1 — Manufacturer shall specify an approximate percentage of fatty oil, type of oil and type of modifier, if any, used.

NOTE 2 — The percentage of any constituent shall be expressed as:

$$\frac{\text{The amount of constituent input}}{\text{Total input} - \text{Water of reaction}} \times 100$$

4. REQUIREMENTS

4.1 Alkyd resins shall comply with the requirements specified in Table 1.

4.2 For non-volatile matter and relative density, exact values have not been specified and only tolerance on declared values have been given. Absolute values will depend upon the type of oil used, method of synthesis adopted and the end use.

4.3 Viscosity of alkyd resins when tested according to the method prescribed in **8** of IS : 354 (Part 1) 'Methods of sampling and test for resins for paints: part 1 General test methods (*second revision*)' (*under preparation*), shall comply with the requirements given in Table 2 for that particular type.

TABLE 1 REQUIREMENTS FOR ALKYD RESINS

(*Clause* 4.1)

Sl No.	Characteristic	Short Oil Alkyd	Medium Oil Alkyd	Long Oil Alkyd	Rosinated Alkyd	Chain Stopped Alkyd	Vinylated Alkyd	Phenolated Alkyd	Uralkyd	Siliconised Alkyd	Epoxy Alkyd	Method of Test, Ref to Clause No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	Colour (on Gardner Scale), *Max* (*see* Note 1)	8	10	10	12	12	12	12	12	12	12	6.2 of Part 1 of IS : 354*
ii)	Non-volatile matter, percent by mass	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	± 1 on the declared value	12 of Part 1 of IS : 354*
iii)	Acid value (*see* Note 2)	15-30	5-20	5-10	30 *Max*	10 *Max*	10 *Max*	30 *Max*	10 *Max*	10 *Max*	10 *Max*	15 of Part 1 of IS : 354*
iv)	Hydroxyl value	100-150	70-90	50-70	←——AS AGREEED TO BETWEEN THE MANUFACTURER AND THE PURCHASER——→							17 of Part 1 of IS : 354*
v)	Relative density at 27/27°C	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	± 0·02 on the declared value	7 of Part 1 of IS : 354*
vi)	Fineness on Hegmann gauge, microns, *Max*	13	13	13	13	13	13	13	13	13	13	6 of Part 2 of IS : 354†
vii)	Drying time, hour(s)											
	a) Surface dry	2 *Max*	2 *Max*	3 *Max*	2 *Max*	3/4 *Min*	1/4 *Min*	1 *Max*	1 *Max*	1 *Max*	1 *Max*	7 of IS : 101-1964‡
	b) Hard dry	8 *Max*	8 *Max*	10 *Max*	10 *Max*	8 *Max*	3/4 *Min*	8 *Max*	5 *Max*	8 *Max*	8 *Max*	
	c) Tack free	24 *Max*	24 *Max*	24 *Max*	24 *Max*	24 *Max*	5 *Max*	24 *Max*	24 *Max*	24 *Max*	24 *Max*	
viii)	Scratch hardness of film (thickness not exceeding 25 microns) after 48 hours of drying, gram, *Min* (*see* Note 3)	—	1 000	800	1 000	1 200	1 200	1 000	1 000	1 000	1 000	15 of IS : 101-1964‡
ix)	Scratch hardness of stoved (film thickness not exceeding 25 microns), *Min* (*see* Note 4)	1 200	—	—	—	—	—	—	—	—	—	do
x)	Gloss of stoved film (thickness not exceeding 25 microns) at 120°C for 30 minutes and 150°C for 12 minutes, *Max*	Glossary hard film	—	—	Glossary hard film	Glossary hard film	Glossary hard film	Glossary hard film	Glossary hard film	Glossary hard film	Glossary hard film	7.7 of IS : 101-1964‡
xi)	Tolerance to solvents:											
	a) Mineral turpentine, *Min*	—	1 : 50	1 : 50	1 : 10	—	—	—	—	--	1 : 10	7 of Part 2 of IS : 354†
	b) Xylene, *Min*	1 : 50	1 : 50	1 : 50	1 : 50	1 : 50	1 : 50	1 : 50	1 : 50	1 : 50	1 : 50	
xii)	Freedom from resin	Free	Free	Free	—	Free	Free	Free	Free	Free	Free	5 of Part 2 of IS : 354†

NOTE 1 — Unless otherwise agreed to between the manufacturer and the purchaser, the colour shall be determined at 50 percent solution mass/volume in appropriate solvent.

NOTE 2 — Acid value shall be calculated on the basis of non-volatile matter of the resin solution.

NOTE 3 — This test is applicable for drying and semi-drying oil alkyd resins only.

NOTE 4 — This test is applicable for non-drying oil alkyd resins.

NOTE 5 — Actual value of drying and quantum of dryers/cross linkers/solvents to be added are to be agreed upon between the manufacturer and the purchaser.

*Methods of sampling and test for resins for paints: Part 1 General test methods (*second revision*) (*under preparation*).

†Methods of sampling and test for resins for paints: Part 2 Special test methods for alkyd resins (*second revision*) (*under preparation*).

‡Methods of test for ready mixed paints and enamels (*second revision*).

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TABLE 2 VISCOSITIES AT 30 ± 0·5°C OF ALKYD RESINS SOLUTION

(*Clause* 4.4)

Sl No.	Types of Alkyd	Diluant/Percent Non-volatile	Unit	High Viscosity	Medium Viscosity	Low Viscosity
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Short oil alkyd	Xylene/50	Stokes	10-12	5-8	3-4
			Seconds	—	—	100-131
ii)	Medium oil alkyd	Mineral turpentine/50 or xylene	Stokes	10-12	7-8	3-4
			Seconds	—	—	100-131
iii)	Long oil alkyd	Mineral turpentine/50	Stokes	3·3-4·7	2·60-3·10	1·4-2·15
			Seconds	130±10	100±10	60±10
iv)	Rosinated alkyd	Mineral turpentine/40	Stokes	10-14	5·0-8·0	4·0-5·0
			Seconds	—	6	140±10
v)	Chain stopped alkyd	Xylene/50	Stokes	—	3·0-5·0	2·0-3·0
			Seconds	—	100-150	80±20
vi)	Vinylated alkyd	a) Xylene/50	Stokes	5·0-6·0	3·0-5·0	2·0-3·0
			Seconds	—	100-150	80±20
		b) Aromax/50	Stokes	10-15	6·0-9·0	3·0-5·0
			Seconds	—	—	100-150
vii)	Phenolated alkyd	Xylene/50	Stokes	—	—	1·4-2·15
			Seconds	—	—	60±10
viii)	Uralkyd	Xylene/50	Stokes	—	3·0-5·0	1·4-25
			Seconds	—	120±20	60±10
ix)	Siliconised alkyd	Xylene/50	Stokes	—	3·0-5·0	1·4-2·15
			Seconds	—	120±20	60±10
x)	Epoxy alkyd	Xylene/50	Stokes	10-14	5·0-8·0	4·0-5·0
			Seconds	—	—	130±10

NOTE 1 — The manufacturer shall specify the solvent to be used as diluant. If not declared by the manufacturer, the one specified against each type of alkyd under column 3 shall be used.

NOTE 2 — Flow cup No. 4 method shall be used, in case the viscosity is above 150 seconds, use alternate methods.

NOTE 3 — Bubble tube method and flow cup No. 4 method provide values in seconds. Values obtained by using bubble tube method are convertible to stokes by multiplying with a factor for the viscometer given in its calibration certificate. Correct size of Oswald — tube viscometer shall be selected depending upon viscosity value.

NOTE 4 — Stokes = 100 centistokes and poise = stokes × relative density.

4.4 Keeping Quality — The material when stored in normal storage conditions shall retain its property for at least 12 months from the date of manufacture as prescribed in Tables 1 and 2.

5. FORM OF SUPPLY

5.1 Alkyd resins shall be supplied as 100 percent solids or any other percentage solution in any suitable solvent as agreed to between the manufacturer and the purchaser.

6. PACKING AND MARKING

6.1 Packing — The material shall be packed in sound, clean and dry containers as agreed to between the manufacturer and the purchaser.

6.2 Marking — Each container shall be marked with the following:

a) Name and type of the material;
b) Mass of the material;
c) Type of fatty acid used;
d) Month and year of manufacture;
e) Batch No. or Lot No. in code or otherwise; and
f) Name of the manufacturer and/or his recognized trade-mark, if any.

6.2.1 The containers may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the Standard Mark may be granted to manufacturers or processors, may be obtained from the Bureau of Indian Standards.

7. QUALITY OF REAGENTS

7.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1970*) shall be used.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

8. SAMPLING

8.1 Representative samples of the material shall be drawn as prescribed under **3** of IS : 354 (Part 1) 'Methods of sampling and test for resins for paints: Part 1 General test methods (*second revision*)' (*under preparation*).

*Specification for water for general laboratory use (*second revision*).